

REMARKS

Claims 1-6 are pending in the application. Reconsideration of the application is respectfully requested based on the following remarks.

I. REJECTION OF CLAIMS 1-6 UNDER 35 U.S.C. § 103(a)

Claims 1-6 were rejected under 35 U.S.C. § 103(a), as unpatentable over U.S. Pub. 2002/0072198 (Ahn) in view of U.S. Patent 6,541,401 (Herner). Withdrawal of the rejection is respectfully requested for at least the following reasons.

- 1). ***Ahn in view of Herner does not teach selectively forming a first insulation material in the trench and not on the mask to fill a lower part of the trench so as to reduce the aspect ratio of the trench, as recited in claims 1 and 6.***

Claims 1 and 6 is directed to a method for fabricating a trench isolation structure, and comprising forming a trench in a substrate using a mask. The trench is then filled ***selectively*** with a first insulation material in a lower part of the trench so as to reduce an aspect ratio of the trench. In doing so, ***the insulating material is deposited in the trench, but not on the mask.*** The combination of Ahn in view of Herner does not teach this feature.

As illustrated in Figs. 5-6, Ahn discloses formation of a trench 121 in a substrate 100, wherein the trench 121 is formed via a mask 103 residing on the substrate. A SiN liner layer 107 is then formed in the trench and on the mask, followed by a thin oxide layer 109 formed over the nitride liner in both the trench 121 and over the mask 103. According to Ahn, the thin oxide layer 109 serves as a buffer layer. (See, e.g., Fig. 6 and [0032]). A first buried oxide layer 119 is then **formed both in the trench 121 and over the mask 103, as can be clearly seen in Fig. 6.**

The Office Action dated June 20, 2008 concedes that Ahn fails to disclose depositing the dielectric material on the surface of the trench and not on the mask. This deficiency is further remedied by the suggested addition of the reference of Herner,

wherein Herner teaches selectively depositing the dielectric material on the surface of the trench and not on the mask. While it is appreciated that Herner provides a selective deposition of silicon oxide by an ozone TEOS process which selectively grows in the trench and scarcely grows on the nitride mask, ***it is still suggested non-obvious to one of ordinary skill in the art at what point in the teachings of Ahn to combine the process of Herner.***

The first assumption in remedying the deficiencies of Ahn is to combine the selective deposition of silicon oxide by the ozone TEOS process at Fig. 5 of Ahn, before the agreed upon deficiency of the first buried oxide layer 119 is formed both in the trench 121 and over the mask 103, as can be clearly seen in Fig. 6. However, to use the taught selective deposition of silicon oxide by the ozone TEOS process, of Herner, will produce the same results as seen in Fig. 6 of Ahn, which is trying to be prevented. While the selective deposition of silicon oxide by the ozone TEOS process, provides a thick film layer on a silicon substrate (Column 6, lines 36-39), Herner does not outline the effects on a thin oxide layer 109, as taught by Ahn. However, it is assumed that the behavior of such a selective deposition of silicon oxide by the ozone TEOS process will have similar results on a thin oxide layer 109 as produced on a silicon substrate as taught by Herner, therefore providing the same deficiencies as seen in Fig. 6 of Ahn. Inasmuch, this first assumption in remedying the deficiencies of Ahn, does not provide the invention as recited by claims 1 and 6.

The second assumption in remedying the deficiencies of Ahn is to combine the selective deposition of silicon oxide by the ozone TEOS process at a point before the thin oxide layer 109 is formed over the silicon nitride layer. However, to use the taught process of selective deposition of silicon oxide by the ozone TEOS process will produce a result wherein silicon dioxide will scarcely be deposited on the silicon nitride mask (See Herner, figure 1b) thus providing no selectively grown silicon dioxide layer in the trench, as recited in claim 1 and 6.

In order to arrive at the invention of claim 1 and 6 of applicant with the given references, it would be necessary to remove the thin oxide layer 109 of Ahn selectively

from the silicon nitride layer 103 before applying the selective deposition of silicon oxide by the ozone TEOS process, a step that is neither taught by Ahn nor Herner. In subsequent steps, Ahn does remove the thin oxide layer 109 from the mask but not until after the first buried oxide layer 119 is formed both in the trench 121 and over the mask 103. Consequently, there is no motivation to modify Ahn in accordance with the claimed invention.

Therefore, the suggested combination of Ahn in view of Herner is respectfully submitted as being improper, and thus the invention as recited by claims 1 and 3, and subsequent dependent claims are non-obvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

II. CONCLUSION

For at least the above reasons, the claims currently under consideration are believed to be in condition for allowance.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account Number 50-1733, REINP107US.

Respectfully submitted,
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